CLAIMS

1. A method to pattern a workpiece with improved CD uniformity using a partially coherent electromagnetic radiation source, including the actions of:
   - determining, for a plurality of layers in said workpiece, CD uniformity as a function of a number of exposure flashes,
   - determining, for a plurality of layers in said workpiece, the cost of patterning as a function of the number of exposure flashes,
   - selecting the number of exposure flashes on a layer by layer basis, which gives a predetermined CD uniformity corresponding to a preferred cost.

2. The method according to claim 1, further comprising the action of:
   - selecting a combination of values of the following parameters:
     - radiation bandwidth
     - pulse length
     - radiation flash frequency

   so that a calculated illumination non-uniformity (3 sigma) from speckle amounts to less than 0.5%.

3. The method according to claim 1 or 2, further comprising the action of:
   - determining a value of a slit width so that a calculated illumination non-uniformity (3 sigma) from speckle amounts to less than 0.5%.

4. A computer assisted apparatus for printing a workpiece with improved CD uniformity by using a partially coherent radiation source, comprising:
   - logic and resources that determine, for a plurality of layers in said workpiece, CD uniformity as a function of the number of exposure flashes,
   - logic and resources that determine, for the plurality of layers in said workpiece, a cost of patterning as a function of the number of exposure flashes,
   - logic and resources that select the number of exposure flashes on a layer by layer basis, which gives a predetermined CD uniformity at a minimum of patterning cost.

5. A method for printing a workpiece with improved CD-uniformity, including the action of:
   - changing a number of exposure flashes per surface element on a layer by layer basis.

6. A method for printing a workpiece with improved CD-uniformity, including the action of:
   - changing a pulse length of exposure flashes per surface element on a layer by layer basis.

7. A method for printing a workpiece with improved CD-uniformity, including the action of:
   - changing a radiation bandwidth of exposure flashes per surface element on a layer by layer basis.

8. A method for printing a workpiece with improved CD-uniformity, including the action of:

- changing a slit width of exposure flashes per surface element on a layer by layer basis.

9. The method according to any one of claims 5-8, wherein said changing is performed for critical layers in the microelectronic device only.

10. A procedure to improve CD uniformity of a layer exposed in a scanner or stepper using partially coherent light, including the actions of:

- providing a scanner system with an optical field larger than 10 mm,

- increasing one or more of the following parameters

a. slit width,

b. laser bandwidth,

c. pulse length,

d. laser flash frequency,

e. number of flashes,

f. number of flashes per field,

g. number of scan cycles per field

until the calculated illumination non-uniformity (3 sigma) from speckle amounts to less than 0.5%.

11. The procedure as in claim 10 but with calculated speckle less than 1%.

12. The procedure as in claim 10 but with calculated speckle less than 2%.

13. The procedure as claimed in claim 10 but with calculated speckle less than 3%.

14. The procedure according to claim 10, wherein non-polarised light is used.

15. The procedure according to claim 10, wherein refractive optics is used.

16. The procedure according to claim 15, wherein at least one diffractive element is used.

17. The procedure according to claim 15, wherein catadioptric optics with at least one diffractive element is used.

18. A procedure to improve CD uniformity of a layer exposed in a maskless scanner using partially coherent light comprising the steps of:

- providing a maskless scanner systems with an optical field larger than 0.5mm,
- increasing one or more of the following parameters:
    a. laser bandwidth,
    b. pulse length,
    c. number of overlayed flashes,

until the calculated illumination non-uniformity (3 sigma) from speckle amounts to less than 0.5%.

19. The procedure according to claim 18, wherein said calculated speckle is less than 1%.

20. The procedure according to claim 18, wherein said calculated speckle is less than 2%.

21. The procedure according to claim 18, wherein said calculated speckle is less than 3%.

22. The procedure according to claim 18, wherein non polarized light is used.

23. An apparatus for printing a workpiece with improved CD uniformity including:

- logic and resources to calculate the speckle,

- logic and resources that change the number of pulses per surface element on a layer to layer basis.

24. A procedure for optimizing the speckle during microlithographic printing including the actions of:

- providing a model for the value of improved CD uniformity,

- calculating the CD uniformity as a function of the number of flashes,

- providing a model for the cost of printing with a particular number of pulses,

- providing logic and resources that select a number of flashes that corresponds to a preferred result,

- providing a control adapted to change the number of flashes, and

- setting said approximately optimized number of flashes.

25. An electronic device with improved CD uniformity printed with speckle less than 1% (3 sigma).

26. The method according to claim 23, further including the actions of:

- determining, for a plurality of layers in said workpiece, CD uniformity as a function of a number of exposure flashes,

- determining, for the plurality of layers in said workpiece, the cost of patterning as a function of the number of exposure flashes,

- selecting the number of exposure flashes on a layer by layer basis, which gives a predetermined CD uniformity corresponding to a preferred cost.